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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/522,779

02/01/2005

Shinji Sakashita

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09/17/2008

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EXAMINER

VELASQUEZ, VANESSA T

ART UNIT

PAPER NUMBER

1793

NOTIFICATION DATE

DELIVERY MODE

09/17/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/522,779	<b>Applicant(s)</b> SAKASHITA ET AL.	
	<b>Examiner</b> Vanessa Velasquez	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 7-15 is/are pending in the application.
- 4a) Of the above claim(s) 15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 7-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>Apr. 18, 2008</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 2, 2008 has been entered.

### ***Status of Claims***

Claims 3-6 are canceled. Claim 15 is withdrawn as being drawn to a non-elected invention in the restriction issued on February 27, 2008. Claims 1, 2, 7-14 are presented for examination on the merits.

### ***Duplicate Claims, Warning***

Applicant is advised that should claim 9 be found allowable, claim 10 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

***Information Disclosure Statement***

One (1) information disclosure statement (IDS) was received April 18, 2008. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

***Claim Rejections - 35 USC § 112, First Paragraph***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 2, and 7-14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. Specifically, claim 1 recites that the oxide comprises aluminum. Upon review of the specification, there appears to be no support for this limitation. Claims 2 and 7-14 are likewise rejected for being dependent on a rejected claim.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 2, and 7-14 rejected under 35 U.S.C. 103(a) as being unpatentable over Miyamoto et al. (EP 1 126 139 A2) in view of Grunke et al. (US 4,936,927) and Lampman ("Wrought Titanium and Titanium Alloys," Vol. 2, ASM Handbook), and further in view of Yao et al. (US 6,066,359) and Yashiki et al. (JP 06-322522).

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Regarding claims 1 and 13, Miyamoto et al. teach a titanium alloy comprising 0.5-2.3% by mass of aluminum and inevitable impurities with titanium constituting the balance (para. [0009]).

Still regarding claims 1, 11, and 13, Miyamoto et al. do not teach a layer of concentrated aluminum in the titanium alloy. Grunke et al. teach a titanium-aluminum alloy wherein the concentration of aluminum is relatively high near the surface of the alloy and gradually decreases inward toward the bulk portion of the alloy (FIG. 3b; col. 4, lines 1-15). The aluminum acts as a coating that protects the titanium alloy (Grunke et al., col. 1, lines 67-68 to col. 2, line 1). Therefore, it would have been obvious to one of ordinary skill in the art to induce a concentration gradient of aluminum particles in the alloy of Miyamoto et al. because the gradient protects the titanium and avoids sharp changes or discontinuities in the mechanical properties of the alloy (col. 4, lines 10-15).

Still regarding claims 1, 11, and 13, Miyamoto et al. in view of Grunke et al. are silent as to the particular concentration of aluminum in the concentrated coating layer. However, it is held that discovering an optimum value of a result-effective variable involves only routine skill in the art (MPEP § 2144.05 Section II). In the instant case, Lampman teaches that aluminum enhances the tensile strength, creep strength, and elastic moduli of titanium alloys (page 599, third column, "Aluminum" sub-section). Therefore, the concentration of aluminum in the concentrated layer is a result-effective variable because it directly affects the mechanical properties of titanium metal as stated above. Therefore, it would have been obvious to one of ordinary skill in the art to have optimized the amount of aluminum in a concentrated layer of the alloy of Miyamoto et al.

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in view of Grunke et al. in order to form a titanium alloy of a desired tensile strength, creep strength, and elastic moduli, as taught by Lampman.

Still regarding claims 1, 11, and 13, Miyamoto et al. in view of Grunke et al. and Lampman are silent as to the presence of an oxide later on top of the concentrated layer. Yao et al., drawn to a method of producing titanium oxide thin film, teach a titanium oxide thin film that is 0.1 micron (100 nm) to 5.0 microns thick (col. 5, lines 50-52) and crystalline (col. 5, lines 44-47). The oxide can be formed on metal substrates (col. 5, lines 1-6) and is corrosion resistant (abstract). Therefore, it would have been obvious to one of ordinary skill in the art to grow a crystalline oxide on the surface of the alloy of Miyamoto et al. in view of Grunke et al. and Lampman because it would enhance the corrosion resistance of the titanium, as taught by Yao et al.

Still regarding claims 1, 11, and 13, Miyamoto et al. in view of Grunke et al. and Lampman, and further in view of Yao et al. do not teach that the oxide contains aluminum. However, Yashiki teaches that alumina ( $\text{Al}_2\text{O}_3$ ) protects titanium and its alloys in corrosive environments (abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to ensure that the oxide on the titanium alloy of Miyamoto et al. in view of Grunke et al., Lampman, and Yao et al. contain aluminum, as taught by Yashiki et al. because the presence of alumina would further enhance the alloy.

Regarding claim 2, Miyamoto et al. further disclose that “any alloying element other than Al **may be incorporated** [in the titanium alloy] so far as the feature of the present invention is not lost” (emphasis added) ([0009]), which teaches that the titanium

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alloy of Miyamoto can include some or no impurities. The ranges listed in claim 2 encompass zero percent. Thus, Miyamoto et al. satisfies the limitations of the instant claim.

Regarding claim 7, the thickness of the aluminum gradient layer is less than 35 microns (Grunke et al., col. 3, line 24), which encompasses the claimed range.

Regarding claim 8, the titanium being in contact with a steel member is in intended use of the alloy and will not be accorded patentable weight. The material with which the alloy is in contact will depend on its placement in an apparatus, machine, building, etc., and this will depend on the use of the alloy.

Regarding claims 9, 10, and 12, the titanium oxide of Yao et al. may be in brookite form (col. 3, lines 23-26, 66-67).

Regarding claim 14, the claim is a product-by-process claim. “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself” (MPEP § 2113). In addition, in order to grow oxide on Ti-Al alloy (refer to claim 1), the base alloy itself would necessarily be oxidized in the process.

### ***Response to Arguments***

Applicant's arguments with respect to the Dearnaley (US 4,465,524) reference have been considered but are moot in view of the new grounds of rejection.

Applicants remarks regarding unexpected results are addressed in the section of this Office action entitled “Declaration under 37 C.F.R. 1.132.”



***Declaration Under 37 C.F.R. 1.132***

The affidavit under 37 CFR 1.132 filed September 2, 2008 is insufficient to overcome the rejection of claims 1, 2, 5, and 7-14 based upon Miyamoto & Yashiki (EP 1 126 139 A2), Yen (*Corrosion Science*, pp. 2031-2051, 1999), Nakayama (JP 61276996 A), Sakiyama et al. (JP 04143235 A), Dearnaley et al. (US 4,465,524), and Yao et al. (US 6,066,359) as set forth in the last Office action because the data is not commensurate with the scope of the claimed invention. Specifically, Applicant provided one data point in which the difference between the concentration of aluminum in the concentrated layer and the bulk is 0.25%, which is less than the claimed range of at least 0.3% or higher. Applicant has not satisfactorily provided enough data to show the criticality of the 0.3% lower limit. For instance, data on the hydrogen absorption of titanium alloys with aluminum concentration differences of 0.29%, 0.28%, 0.27%, etc., with all other variables being fixed, has not been presented. In view of the foregoing, when all of the evidence is considered, the totality of the rebuttal evidence of nonobviousness fails to outweigh the evidence of obviousness.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vanessa Velasquez whose telephone number is (571)270-3587. The examiner can normally be reached on Monday-Friday 8:30 AM-6:00 PM ET.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King, can be reached at 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/  
Supervisory Patent Examiner, Art  
Unit 1793

/Vanessa Velasquez/  
Examiner, Art Unit 1793